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ABSTRACT

In this study the relationship between mother's teaching style (verbal instruction vs. demonstration) and the child's performance on four memory tests was investigated. Mothers' teaching style with 9-year-old children was observed in an induced teaching situation in the home, in a Guatemalan Maya town. In the induced teaching situation, the mother instructed her child in making an object out of tinkertoys. Her behavior was coded in categories involving verbal instruction and physical demonstration. The memory tests revealed verbal and visual factors, rather than unitary memory ability. Thirty-one children were selected typifying the following memory patterns: high performance on verbal with low on visual, high on all, low on all, and low on verbal with high on visual. The percentage of mother's verbal instruction for each group (incidence of verbal instruction divided by incidence of verbal instruction plus incidence of demonstration) was 68%, 64%, 42%, and 32%, respectively. Kruskal-Wallace one-way analysis of variance showed the differences between the groups to be significant ($p < .02$). The results indicate that experience with verbal instruction, as opposed to demonstration in context, may play an important role in performance on cognitive tests, particularly in tests with a strong verbal component. (Author/SB)

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MOTHER'S TEACHING STYLE AND CHILD MEMORY: A HIGHLAND GUATEMALA STUDY

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Various investigators have been concerned with the relationship of instructional style and cognitive performance. From social learning theorists come demonstrations that observational learning is sometimes most effective by itself and other times is improved by verbal instructions. From studies of social class differences come findings that in teaching situations lower class mothers are likely to provide specific instructions, whereas middle class mothers give more generalized rules. One of the most common findings in cross-cultural studies of cognitive development is the relationship of schooling to cognitive performance. My approach to the relationship between instructional style and children's cognitive performance derives from the cross-cultural literature.

Several writers have discussed just what factors in schooling might bear a causal relationship to cognitive performance. Scribner and Cole and Bruner have compared the formal instruction which goes on in the classroom with the informal instruction which characterizes learning outside of the school. Formal instruction involves dealing with ideas out of their context, whereas in informal instruction it is possible to see and manipulate the

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objects involved in the lesson. Margaret Mead points out that in informal learning an adult model rarely formulates a particular practice in words or rules but instead provides a demonstration of it. Vygotsky states that school emphasizes "scientific" concepts which build from the top down (e.g., 'exploitation'), while everyday life builds concepts from the bottom up (e.g., 'brother').

Clearly, the dichotomy of formal vs informal instruction cannot be mapped directly onto school vs everyday learning. Formal learning predominates in the school but in everyday life there is variability, with some contexts being characterized by formal, and others by informal instruction.

In the present investigation, I chose to observe variation in instructional styles outside of the school, with mothers of 9-year-old school children. I would rather have employed naturalistic observations of the mother's teaching style with the child. However, in 1800 observations of 60 children, spread out over different times of the day and extending over three months, I was able to capture only six instances in which the child was being taught anything by anyone in his home. Thus it was necessary to carry out an induced teaching session with the mother and the child. I will describe the teaching session after telling you about the sample and about the memory tests.

The sample was 60 school children, all 9 years of age, from a rapidly modernizing Mayan Indian community in Highland Guatemala. Half were boys and half were girls, drawn equally from rich and poor, modern and traditional families.

Each child was given four memory tests consisting of the combination of the categories of visual/verbal and recognition/recall memory. Thus there were tasks involving visual recognition, visual recall, verbal recognition, and verbal recall. The materials were pre-tested for familiarity to the children. The visual tasks used three-dimensional toy objects, and the verbal tasks involved sentences and stories. These materials were chosen in an effort to insure that the children would find the tasks intrinsically meaningful, since they were test-naive. They were familiarized with the testing room and the experimenters in a preliminary visit to the test setting. All testing was done in the local language, a Maya-Quichédialect, by the author and a 16-year-old local girl.

The first test was visual recognition, in which the child was shown a small arrangement of objects, and a few minutes later was asked to distinguish it from a very similar foil. Each child was tested on 32 such pairs of small scenes.

In the visual recall (reconstruction) test, the child watched 20 toy objects put into a panorama resembling the village. After he had studied the completed scene as long as he wished, the objects were removed, and several minutes later he replaced them in the scene. He chose the items from a pool of 80 familiar items, all of which he had named at the beginning of the session in order to decrease the effectiveness of a recognition strategy for choosing the toys to replace in the scene. Each child reconstructed two scenes each involving 20 objects drawn from the pool of 80 items.

Verbal recognition was done with sentences constructed in pairs: an original and a foil which was syntactically similar but differed in meaning. (E.g., "My mother went to Sololá to sell shirts in the market."..."My mother went to Sololá to sell pants in the market.") The child had to decide whether or not the second differed from the first. Each child received 48 pairs of sentences.

Verbal recall involved stories taken from the mythology of the town, common 35 years ago but unknown to the current children. The child was told two stories and asked to repeat them to a confederate who had not heard the stories when they were told to the child.

All four memory tests intercorrelate positively (Figure 1), and correlations are relatively high between the two visual tests and between the two verbal tests. (The high correlation between verbal recall and visual recognition is a puzzle, as it crosses all modalities.) The correlation matrix includes both sexes. If taken separately, the boys' correlations between tests are higher than the girls', but they show the identical pattern. Aside from that, there were no sex differences in test performance.

For the induced teaching task, I selected a reduced sample on the basis of the memory test performance. Standard scores for visual recognition and recall were summed, as were those for verbal recognition and recall. Figure 2 shows the distribution of the children's visual and verbal test scores. With a median split, I selected boys and girls (four of each, where possible) best exemplifying each quadrant's characteristics. From the

upper right hand quadrant, I selected the children who did best on both verbal and visual, and similarly from the lower left quadrant, I selected on the basis of extremely low scores. For the other two quadrants, a corresponding procedure was followed, except that children were excluded whose two visual scores were not consistent, or whose two verbal scores were not consistent.

The induced teaching task was done in the child's home. The mother was asked to help us administer one last test to her child. She was able to see a tinkertoy object which was inside a box so that the child could not see it. The child had the pieces to make an identical object, and the mother was told to instruct her child in making the copy. She was told explicitly that she could tell him what to do and that she could touch the pieces and show him what to do, but was not to put the pieces together herself. Each mother-child pair completed two such toys, a man and a horse.

My tester and I coded the observations as verbal instruction or demonstration, making a check each time the mother provided any information verbally or by demonstration or both. Inter-coder reliability was .88. The mothers showed stable styles of instruction, with a large amount of variability between mothers. Mothers who demonstrated the task typically pointed to the pieces to be used, or picked them up and indicated the correct orientation. Verbal instruction usually involved describing the pieces. The mothers did not orient the children by telling them the name of the object they were to make, although a few gave information on the parts of the object (e.g., calling the legs "legs").

Figure 3 shows the relationship between the mother's teaching style and the child's memory performance. The four quadrants are shown across the bottom of the graph, with the mean standardized memory test scores. The mean number of times that mothers gave each kind of instruction is shown on the vertical axis. There were no sex differences. Analysis of variance showed the four types of memory performance to be associated with significantly different amounts of verbal instruction ($F = 2.99$, $df = 3/27$, $p < .05$) and of demonstration ($F = 6.39$, $df = 3/27$, $p < .001$) but with equal amounts of total teaching (verbal instruction plus demonstration). Mothers who provided more verbal instruction had children who performed better on the verbal memory tests, and mothers who provided more demonstration had children who showed lower performance on the verbal memory tests. Mother's teaching style was unrelated to performance on the visual memory tests.

I would like to point out that these data do not provide evidence for causal direction. It could be that the mother's style of teaching influences the child's memory performance, or that the mother is sensitive to the style and abilities of her child and teaches him accordingly. Or both mother and child may be influenced by some other variable.

I will briefly mention some other variables related to the mother's teaching style. The amount of education which the mother has received is correlated .41 with the amount of verbal instruction, and(insignificantly) -.26 with the amount of demonstration. (Most mothers have no schooling or just a year, but a few have fourth or sixth grade.) I gathered many indications of the wealth of the families, and none of them shows any relation

to the teaching style of the mother. However, there is a relationship with the modernization of the family, as indexed by whether or not the mother wears underpants (a rather subtle measure of modernization). About 43% of the mothers wear underpants, and those who do are more likely to teach their children by verbal instruction (correlation .34). Another family variable related to the mother's teaching style is the birth order of the child. Firstborns are more likely to be taught by verbal instruction (.32) and less likely to be taught by demonstration (-.37). The children who perform well on verbal memory tests but poorly on visual are mostly firstborns, and those who perform poorly on verbal but well on visual are more commonly laterborns. This makes sense in that laterborns would be expected to pick up most of what they know from watching a slightly older sibling, who would be unlikely to teach by verbal instruction. Firstborns are more commonly in the presence of adults who would teach them by verbal instruction.

The results I have described do not show a <u>simple</u> pattern, but they do show a coherent pattern of relationship between mother's teaching style and children's memory performance.

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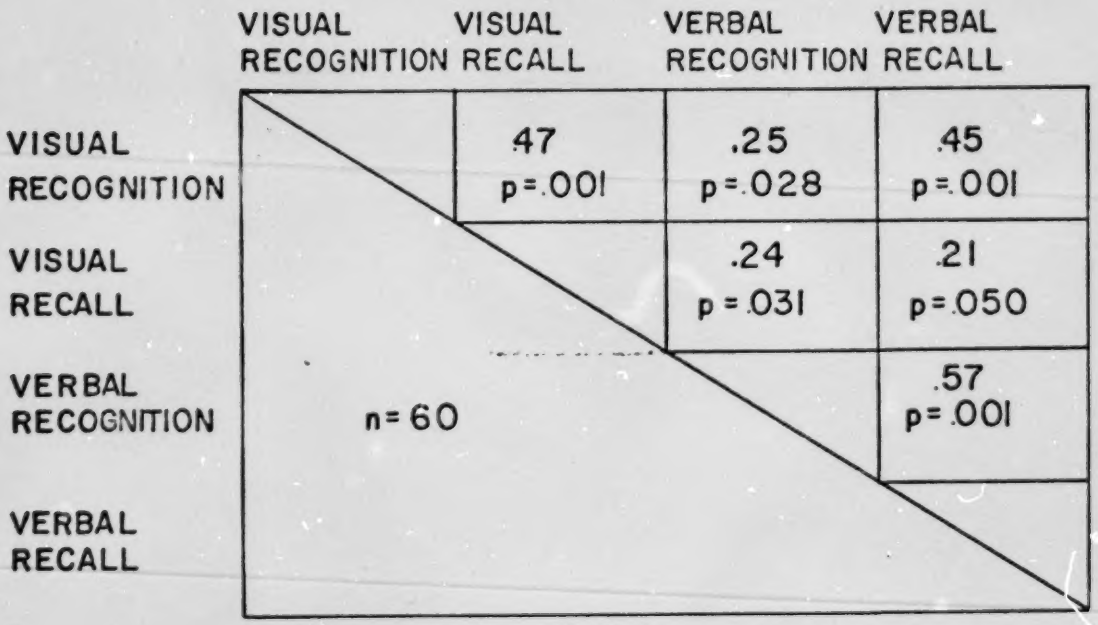
FIGURE 1.

INTERCORRELATIONS OF MEMORY TESTS



SELECTION OF REDUCED SAMPLE ON BASIS OF MEMORY PERFORMANCE

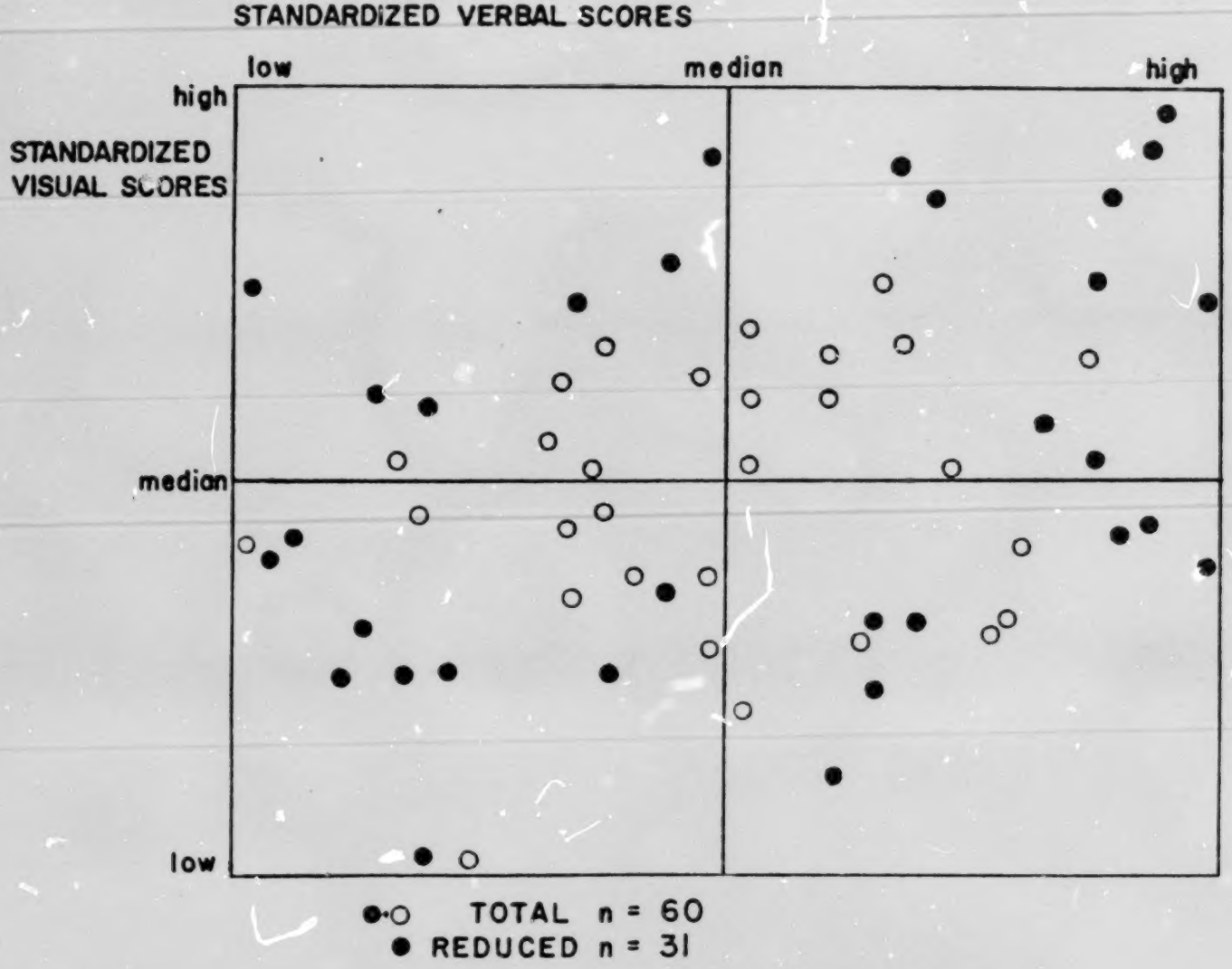


FIGURE 2.

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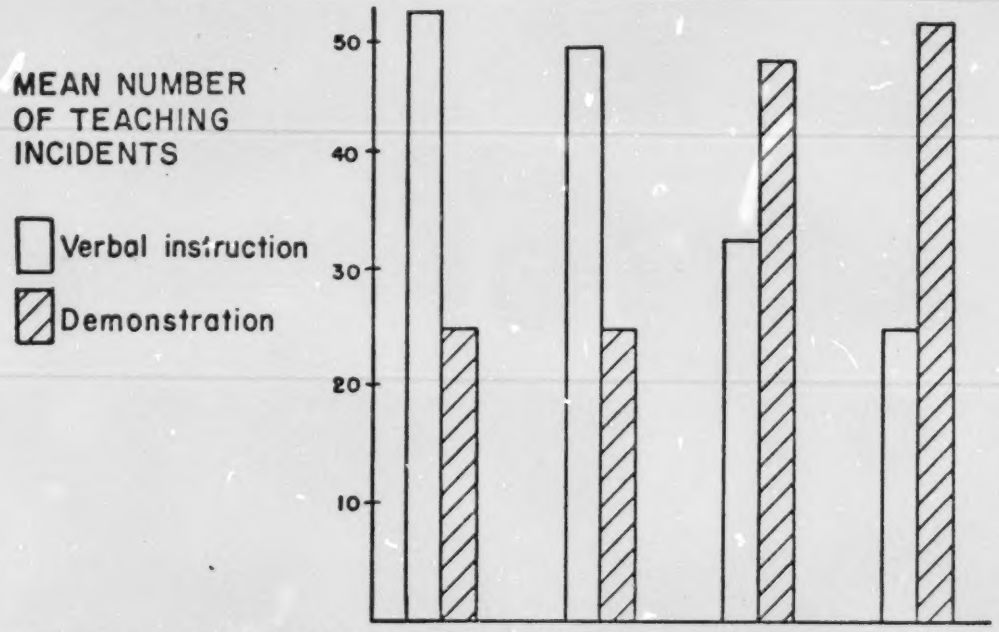
FIGURE 3.

MATERNAL TEACHING STYLE AND CHILD MEMORY



MEMORY PERFORMANCE	split	high	low	split
Verbal	+1.67	+2.03	-1.96	-1.52
Visual	-1.12	+2.24	-1.74	+1.55